

The background is a painting of a landscape. The sky is filled with dark, heavy, grey clouds. The ground is a vibrant red, with several winding paths or tracks. Scattered across the red landscape are numerous small, dark, bushy plants. The overall mood is somber and dramatic.

# BLACK MIST BURNT COUNTRY

Testing The Bomb: Maralinga and Australian Art

AN EDUCATIONAL RESOURCE FOR YEARS 9 – 12

# BLACK MIST BURNT COUNTRY

## Testing The Bomb: Maralinga and Australian Art

AN EDUCATIONAL RESOURCE FOR YEARS 9 – 12

“We seen this smoke...it was black, greasy, sort of shiny...it was rolling up to us through the mulga. We thought it was a mamu, a devil spirit. The old people got their woomeras to wave it away, but it was a very strong mamu.”



Yami Lester – Yankunytjatjara man and victim of the Emu Fields atomic tests in 1953.



The *Black Mist Burnt Country* exhibition explores the British atomic testing that occurred at the Monte Bello Islands (WA), Emu Field (SA) and Maralinga (SA) between 1952 and 1963, and reflects on the subsequent human and environmental impact of the tests.

Each chapter of the *Black Mist Burnt Country* story is linked to a key artwork. When you see this symbol, stop in front of the relevant piece and complete the analysis task.



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# Timeline of Nuclear Testing in Australia

## September 1942

US General Leslie Groves assigned to command secret *Manhattan Project*. Groves hires Robert Oppenheimer to run the scientific development of the atom bomb. The project eventually employs 130,000 people

## 6 August 1945

*Enola Gay* drops *Little Boy*. 70,000 are killed immediately.

## 9 August 1945

*Bockscar* on mission to drop plutonium bomb *Fat Man*. Smoke from fire-bombing prevents targeting of Kokura. *Bockscar* is diverted to Nagasaki but misses target. 40,000 die instantly.

## January 1946

UN Assembly calls for the elimination of atomic weapons.

## September 1950

Australian PM Robert Menzies receives request from British PM Clement Attlee to test atomic weapons in Australia. Menzies agrees.

**March 1951** British seek to use Monte Bello Islands (WA) for tests.

## 1952

Ooldea Aboriginal Reserve closed to move people away from weapons tests. Anangu Pitjantjatjarra are displaced and re-settled at Yalata on the Great Australian Bight.

## June 1952

Liberal government passes *Defence (Special Undertakings) Act*, which allows the British Government access to remote parts of Australia

to undertake atomic weapons tests. The general public is largely unaware of the nature and risks of testing program.

## October 1952

First UK atomic test in Australia, codenamed *Hurricane*. Bomb is exploded inside the hull of frigate HMS *Plym*, which is mostly vapourised in the blast. William Penney supervises test.

## October 1953

*Totem 1* and *Totem 2* atomic tests at Emu Field (SA). 'Black mist' incident affects the health of Aboriginal people in the area.

## May 1955

British and Australian governments announce permanent test site at Maralinga, South Australia.

## May-June 1956

*Operation Mosaic*: UK conducts two atomic weapon tests at the Monte Bello Islands, the second of which (G2) spreads fallout across mainland Australia." Australian Labor Party withdraws political support for the British tests in the wake of Mosaic G2 test.

## September-October 1956

Four atomic devices are trialed at Maralinga codenamed *Operation Buffalo*. Himsworth and Bronk reports on hazards of radioactive fallout and strontium-90.

## May 1957

The Milpuddie family incident. Artists demand immediate end of nuclear tests from Australian government Signatories include Dargie, Waller, Counihan, Howley, French, Perceval and Blackman.

**September 1957**

Britain commences *Operation Antler*, which includes three precursory tests for British hydrogen bombs.

**January 1958**

Australia's first nuclear reactor goes critical in Lucas Heights, south of Sydney, which is built for research and production of medical radioisotopes.

**April 1963**

Britain concludes 'minor' trials program at Maralinga before Test Ban Treaty comes into place.

**1964**

Partial cleanup of Emu Field and Maralinga commences.

**1965**

PM Menzies commissions report into a possibility of a nuclear weapons program in Australia.

**May 1967**

PM Harold Holt commissions study to assess the possibility of domestic manufacture of nuclear weapons.

**August 1967**

Britain completes clean-up operation at Maralinga, *Operation Brumby*, and vacates the site.

**1967**

A Federal referendum on allowing the Commonwealth to make laws in respect of Indigenous people, and for Indigenous people to be counted in the Census, receives overwhelming support.

**1968**

*Pearce Report* reveals that 20kg of highly toxic plutonium are buried at Maralinga's *Taranaki* site. Most of the plutonium is later found to be scattered around the site.

**December 1976**

Avon Hudson, RAAF veteran, reveals on TV that he had "helped bury 26 boxes of radioactive plutonium waste at Maralinga under just three metres of sand".

**June 1978**

Australia joins UN Committee on Disarmament.

**May 1980**

*The Advertiser* in Adelaide runs a story about Yami Lester.

**1982**

Midnight Oil album *10, 9, 8, 7, 6, 5, 4, 3, 2, 1*,

with the track *Maralinga* reaches top of Australian charts.

**April 1983**

Palm Sunday rallies call for the end of the arms race. More than 150,000 protest in Australian major cities.

**May 1984**

A scientific mission to Maralinga exposes a hitherto unknown distribution of plutonium contamination at Maralinga.

**1984**

The South Australian Government passes *Maralinga Tjarutja Land Rights Act*, which grants traditional owners freehold title to an area of 81,000 sqkm.

**August 1984**

Royal Commission into British Nuclear Tests established.

**November 1985**

Royal Commission hands its findings to the Federal Government, including recommendations amounting to compensation for victims (servicemen, Aboriginal people and civilians) and full clean-up of test sites.

**1990**

Lin Onus creates sculpture *Maralinga*, the first artwork by an Indigenous artist inspired by the nuclear tests in Australia

**1993**

UK government agrees to pay £20m on an ex gratia basis towards the cost of the Maralinga site rehabilitation.

**July 1996**

Soil excavation starts at Maralinga's *Taranaki* site.

**March 2000**

*Maralinga Rehabilitation Project* declared completed which Science Minister Nick Minchin declares as "world's best practice" and announces the site "clean and safe".

**2009**

Section 400 at Maralinga is handed back to traditional owners encompassing 3000 sq km, including the 'forward area' where seven nuclear devices were exploded and almost 600 so-called 'minor tests' were conducted.

**November 2014**

Maralinga-Tjarutja people receive unrestricted access to Maralinga. The site was limited because it was part of the Woomera restricted area.

**January 2016**

The *Bulletin of Atomic Scientists* leave *Doomsday*

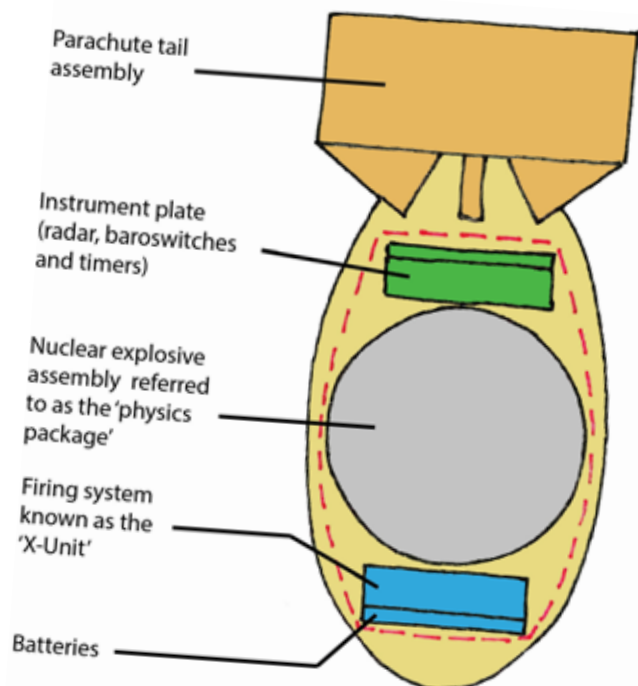


# Development of the Atomic Bomb

The atomic bomb or A-bomb was developed by a group of international scientists during World War II as part of a top-secret American weapons program called the Manhattan Project. The project was led by Lieutenant General Leslie Groves of the United States Army and physicist J. Robert Oppenheimer. By 1945, the Manhattan Project had become the first program to successfully develop a nuclear weapon.

Atomic bombs were designed to wipe out large areas when dropped from a single aircraft. Their destructive nature had many effects on humans and the environment. The initial blast killed victims instantly, flattened buildings and incinerated all combustible materials.

## How an Atomic Bomb Works



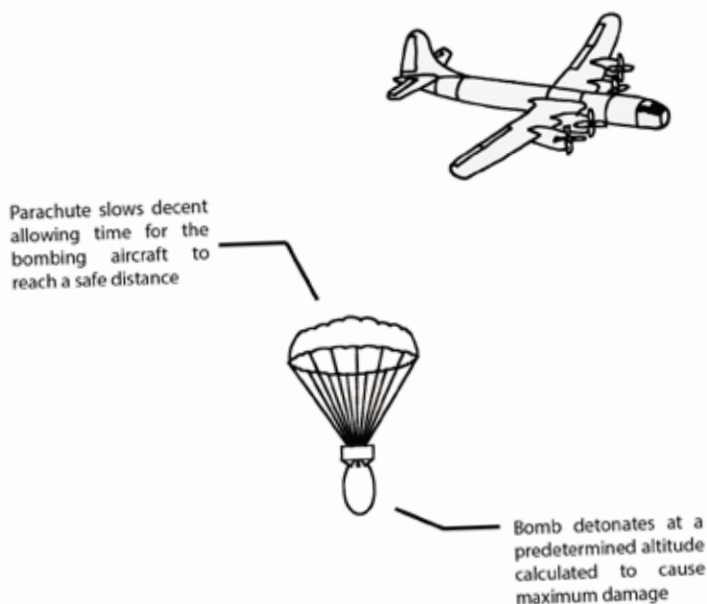




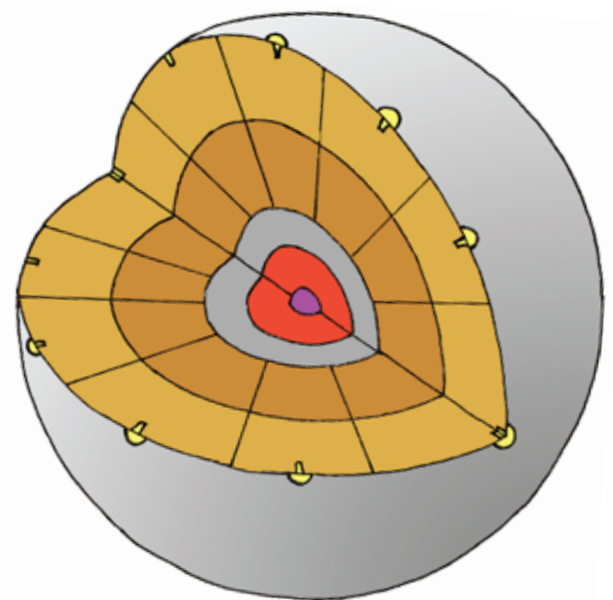
Manhattan Project scientists, 1940

The physical impact of exposure to radiation included nausea, vomiting, headaches, fatigue, fever and a red skin rash. The lands became contaminated with radioactive material that worked its way into the ecosystem. The long-

term impacts affected generations, as victims exposed to the blast died slowly and horribly from radiation sickness, and often their children developed cancer. In many ways, the A-bomb was a devastatingly perfect weapon.



**DELIVERY**



- Detonators - Explosive charges located around the outside of the sphere ignite the bombs explosive lenses.
- Outer Explosive Shell - Fast burning high explosives create a compressive shockwave that travels inward.
- Inner Explosive Shell - Slower burning high explosives change the shape of the shockwave making it spherical.
- Tamper - A shell of dense metal designed to prolong the nuclear reaction
- Fissile Material - A shell of Plutonium, Uranium or a combination of the two undergoes nuclear fission and releases the bombs energy.
- Initiator - At the center of the sphere, a neutron source provides a burst of neutrons that kick starts the nuclear reaction.

**DETONATION**



The 'cap' (head) of the mushroom is a type of cloud called *Pyrocumulus*. 'Pyro' comes from the greek word *pyr* which means fire. Formed during the initial explosion this ball of hot and dense gases rises into the atmosphere. As it cools it expands and flattens out laterally. The mushroom can also form during non-nuclear explosions.

Air heated by the explosion creates a chimney-like effect and forms the 'stipe' (stalk) of the mushroom.

### The Mushroom Cloud

The most iconic characteristic of an atomic bomb is the mushroom shaped cloud that forms during the explosion. The cloud forms as the intensely hot and dense gases created in the explosion interact with the cooler and less dense atmosphere. In physics this interaction is described as the 'Rayleigh-Taylor instability.' While it is a common sight in footage of nuclear explosions, not all explosions produce this unique shape.



JUN. 1945 7



**Stop,  
See,  
Interpret,  
Share**

Hilda Moodoo  
(Pitjantjatjara, b.1952)  
**Maralinga Bomb** 2009  
acrylic on canvas  
40 x 50 cm  
Produced for *Maralinga,  
The Anangu Story*  
by Yalata and Oak Valley  
Communities with  
Christobel Mattingley,  
first published by Allen &  
Unwin in 2009.  
© Maralinga Tjarutja Inc.  
representing the Oak  
Valley and Yalata  
Communities, 2009



**BLACK MIST  
BURNT COUNTRY**

View the artworks in the exhibition and  
respond to the questions below.

1. How many times is the symbol of the mushroom cloud used in the exhibition?
2. Why do you think so many of the artists have included a mushroom cloud?
3. Which artwork in the exhibition uses the mushroom cloud to the best effect? Explain your answer.
4. What other symbols or images occur often in the exhibition?



# The Bombing of Hiroshima

After the successful development of the atomic bomb and a test-firing in New Mexico the United States government authorised the dropping of an atomic bomb on Hiroshima, Japan in the closing months of World War II.

On 6 August 1945, at 8.15am, the *Enola Gay*, a B29 Superfortress bomber, dropped an atomic bomb (named 'Little Boy') on Hiroshima with devastating consequences. The aircraft was named after Enola Gay Tibbets, the mother of

the pilot, Colonel Paul Tibbets. While the US government justified its decision to drop the bomb by claiming that the action shortened World War II, it remains a contentious historical issue.

Eyewitnesses recalled that the impact of the bomb was accompanied by a blinding flash and a loud boom. 'Little Boy' missed its planned target of the Aioi Bridge, but instead detonated over the Shima Surgical Clinic.

General panoramic view of Hiroshima after the bomb. Official U.S. Army photo. Library of Congress Prints and Photographs Division, LC-USZ62-134192.







Ms. Akiko Takakura was 20 years old when the bomb fell. She was in the Bank of Hiroshima, 300 meters away from the hypocenter.

"Many people on the street were killed almost instantly. The fingertips of those dead bodies caught fire and the fire gradually spread over their entire bodies from their fingers. A light gray liquid dripped down their hands, scorching their fingers. I was so shocked to know that fingers and bodies could be burned and deformed like that. I just couldn't believe it. It was horrible. And looking at it, it was more than painful for me to think how the fingers were burned, hands and fingers that would hold babies or turn pages, they just, they just burned away. For a few years after the A-bomb was dropped, I was terribly afraid of fire. I wasn't even able to get close to fire because all my senses remembered how fearful and horrible the fire was, how hot the blaze was, and how hard it was to breathe the hot air. It was really hard to breathe. Maybe because the fire burned all the oxygen, I don't know. I could not open my eyes enough because of the smoke, which was everywhere. Not only me but everyone felt the same."

## Impact

The immediate effects of the bomb were the destruction of all buildings and vegetation and tens of thousands of deaths. While figures vary greatly, a conservative estimate is that 70 000 people were killed instantly and many more continued to die over the following months and years from burns, injuries and illnesses.



Injured female survivor of the Nagasaki atomic bombing. Her skin is burned in a pattern corresponding to the dark portions of a kimono worn at the time of the explosion. Sept. 1945.Shutterstock

Reginald Rowed  
(Australia, b.1916, d.1990)  
**Rebuilding Hiroshima** 1946  
water colour on paper  
51 x 66 cm  
© Australian War Memorial



"I realize the tragic significance of the atomic bomb ... It is an awful responsibility which has come to us ... We thank God that it has come to us, instead of to our enemies; and we pray that He may guide us to use it in His ways and for His purposes."

## The Aftermath

President Harry S. Truman, August 9, 1945

To the American government, the bombing of Hiroshima was an opportunity to test the work of the Manhattan Project. The government's subsequent refusal to share the research with wartime allies foreshadowed the start of the international arms race between the Soviet Union and United States. The larger political and moral impact of the Hiroshima bombing was the spectre of a weapon that could be dropped from a single plane and cause wide-spread devastation.

Despite the total destruction of Hiroshima, Japan refused to surrender. On 9 August 1945, three days after the bombing of Hiroshima, the United States dropped a second atomic bomb (named 'Fat Man') on the city of Nagasaki. Six days later, Japan surrendered, effectively ending the war in the Pacific.

Children's storybooks such as *My Hiroshima* and *Sadako and the 1000 Paper Cranes* convey both the short and long term effects of the atomic bomb on the people of Japan. In Sadako's story, a girl becomes terminally ill with leukaemia, a form of blood cancer, as a result of her mother's exposure to radiation poison after Hiroshima. A school friend recounts an ancient belief that anybody who folds 1000 paper cranes will be granted one wish by the gods. Sadako begins the process of folding

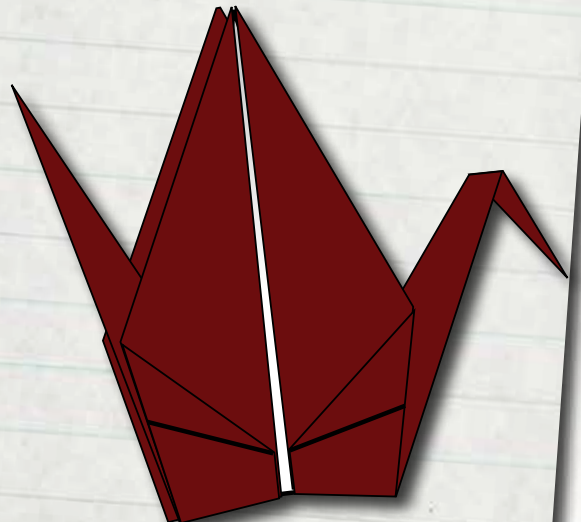
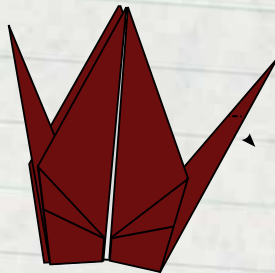
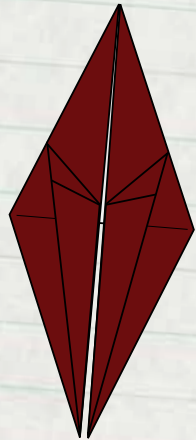
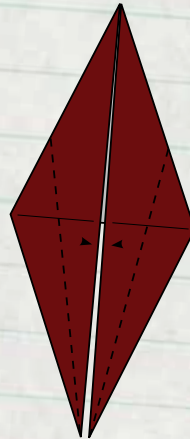
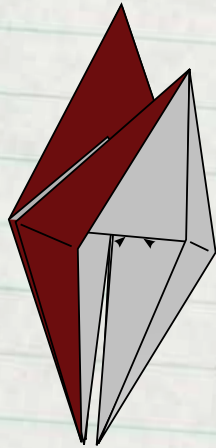
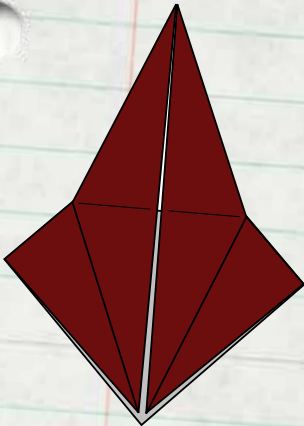
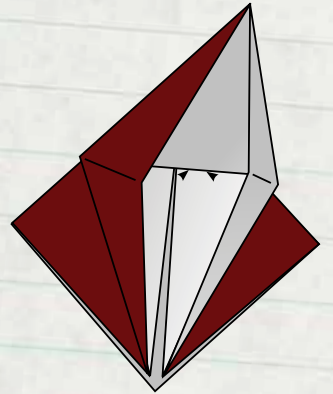
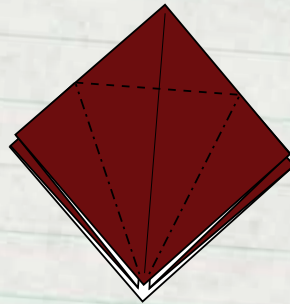
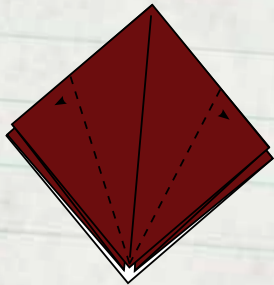
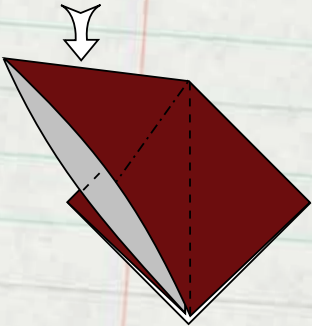
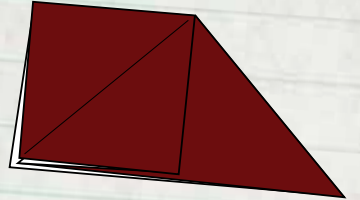
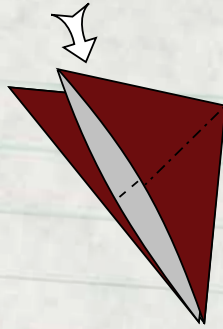
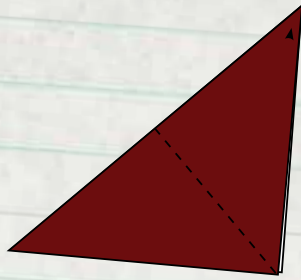
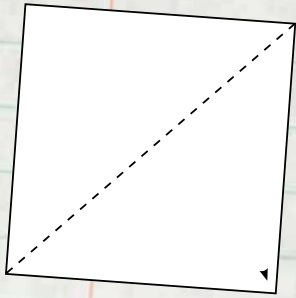
1000 paper cranes with the hope that she will be granted her wish to recover. In the book, tragically, Sadako dies before she can complete her task, but her friends finish the task on her behalf. In 1958, a statue of Sadako was erected in the Hiroshima Peace Memorial Park to commemorate children like her who died of leukaemia following their parents' exposure to radiation in 1945.



Statue of Sadako at the Hiroshima Peace Park



# How to Fold a Paper Crane



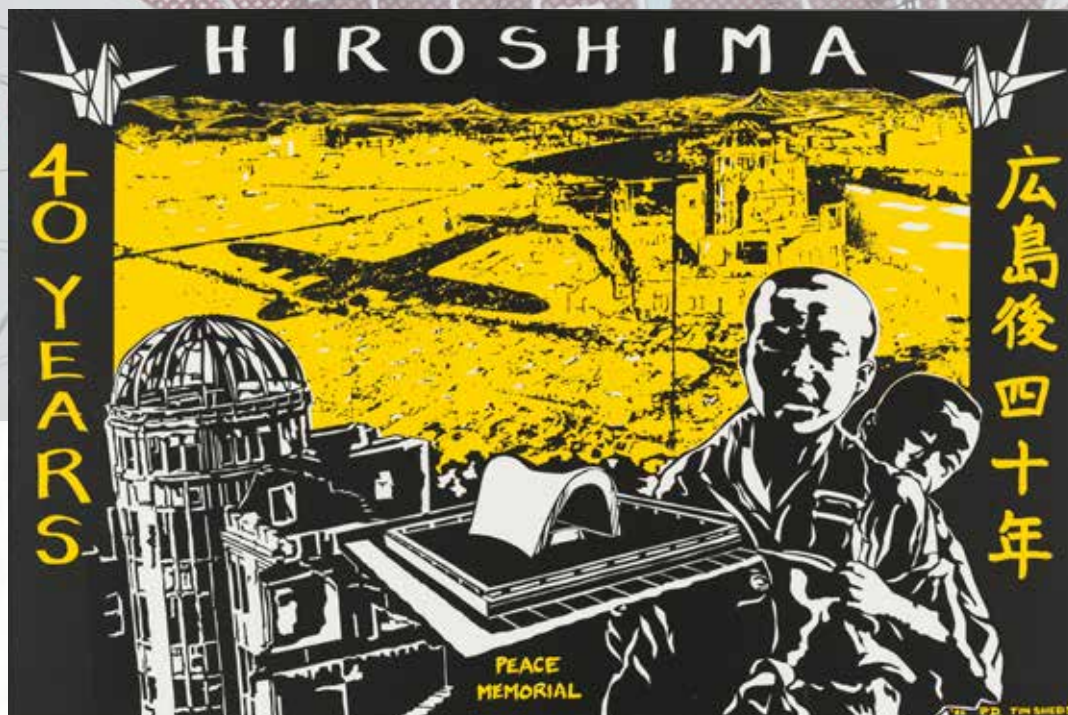
Video instructions ►





**Stop,  
See,  
Interpret,  
Share**

Pam Debenham  
(Australia, b.1955)  
*Hiroshima 40 years*  
1985  
screenprint on paper  
51 x 76 cm  
Courtesy of the artist  
© Pam Debenham/  
NGA



**BLACK MIST  
BURNT COUNTRY**

Examine the poster and respond to the questions below.

1. What do you think is the purpose of this poster?
2. What symbols and objects are used to convey the message of the poster?  
Why have they been chosen?
3. Why do you think the colour yellow is so prominent in the poster?
4. Why has the paper crane become the symbol of the peace movement?





# British Tests in Australia

The development and use of the atomic bomb by the United States during World War II dramatically altered the international balance of power.

Despite Britain's strong political ties to United States and the collaboration of the two nations during the Manhattan Project, the United States Congress passed the McMahon Act in 1946. The act prevented America from partnering with foreign powers for the purpose of furthering nuclear science. Britain was effectively shut out of further nuclear research and development of atomic weapons with the United States, including tests on US soil.

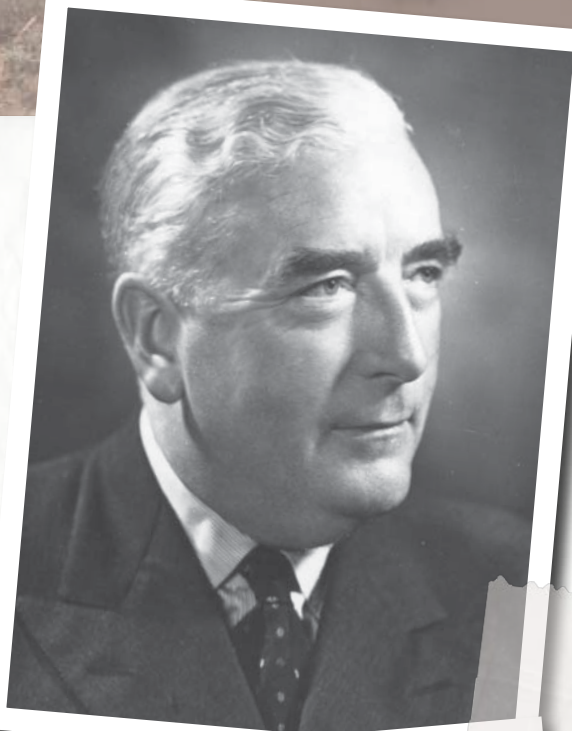
Britain felt vulnerable after WWII as it lacked a standing army and faced a growing aggressor in Europe – the

Union of Soviet Socialist Republics (USSR, also known as the Soviet Union). Britain therefore sought to develop its own atom bomb program; it looked for suitable sites for tests in Scotland, and in Commonwealth countries such as Canada and Australia.

Britain emphasised that this partnership would be mutually beneficial in light of the growing threat of the Soviet Union and the spread of communism. Nations that did not develop nuclear weapons were increasingly defenceless in the event of nuclear war.

Therefore, British Prime Minister Clement Attlee approached Australian Prime Minister Robert Menzies with a proposal to conduct testing in Australia.



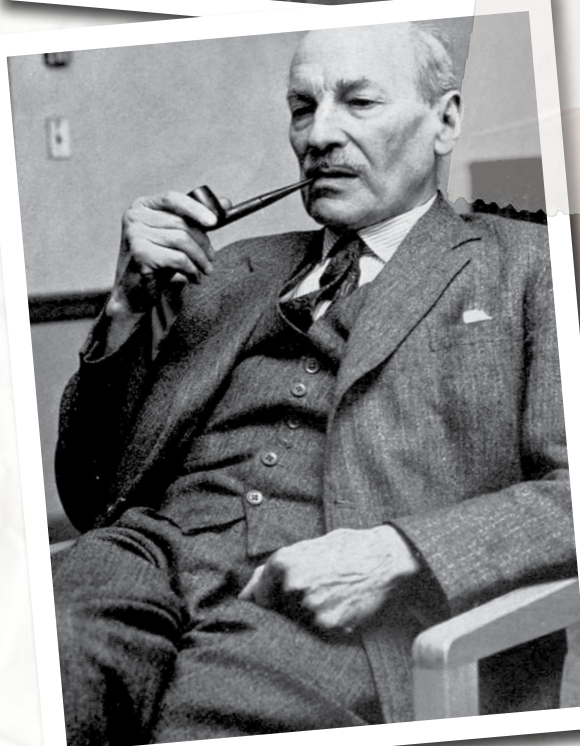


Howard Beale, Australia's Minister of Supply, supported the partnership, stating that, 'England has the bomb and the knowhow; we have the open spaces, much technical skill and great willingness to help the Motherland.'

Prime Minister Menzies justified the tests with the assurance that they would be 'conducted in conditions which will ensure that there will be no danger whatever from radioactivity to the health of the people or animals in the Commonwealth.' This turned out not to be the case.

## Australian Uranium

In addition to providing the location for the British atomic tests, Australia was involved in the arms race by supplying raw materials for nuclear weapons. Rich deposits of uranium ore had been mined in South Australia since 1906 and were exported in the mid-1950s.



Top: Sir Robert Menzies;  
Above: Clement Attlee



A worker opens a drum of uranium oxide from South Australia 1957. Courtesy of the National Library of Australia.





## Stop, See, Interpret, Share

Toni Robertson  
(Australia, b.1953)  
Chips Mackinolty  
(Australia, b.1954)

***Daddy, What did YOU do in the Nuclear War?*** 1977  
screen print on paper  
76 x 50 cm  
Collection: Art Gallery of Ballarat  
© the artists

*This poster by Toni Robertson is a retitled World War I propaganda poster. The original poster (above) was captioned 'Daddy, what did you do during the Great War?'*



**BLACK MIST  
BURNT COUNTRY**

Examine the poster and respond to the questions below.

1. What was the function of the original WWI poster?
2. How has the new caption changed the meaning of the poster?
3. What point is the artist trying to make to an Australian audience?



# Maralinga: Ground Zero

As a result of Menzies' commitment to Britain, a total of 12 atomic tests were conducted at the Monte Bello Islands, Maralinga and the nearby Emu Field between 1952 and 1957. The permanent site was surveyed by Len Beadell in 1953 and given its new name, and was ready for use in September 1956. It was in a remote location, part of the much larger Woomera Prohibited Area, but it was not uninhabited. In fact, thousands of Indigenous people traversed the area. Fittingly, 'Maralinga' means 'thunder' in the Garik language.

Maralinga was made up of a series of streets and avenues, much like a suburban neighbourhood. Both major and minor trial sites were named after locations where Australian soldiers fought in the South Pacific during World War II.



▲ Locations of the three British testing sites on Australian soil.



◀ Maralinga testing range. Photograph by JD Mittmann.

▶ Maralinga Airfield, 2015. Photograph by JD Mittmann.

The workforce was mostly made up of British and Australian military personnel and scientists. They were given lodgings at Maralinga Village, a series of barracks which at the time housed more than 2000 British and Australian service personnel. It also included an airfield, hospital and the headquarters for the Commonwealth Police's security operations. The initial work on the site was to build the infrastructure needed for the atomic tests, including roads, barracks, laboratories, test towers and workshops.

A 11-1-63		EMPLOYED BY A216370		PHOTO	
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<input checked="" type="checkbox"/> U.S.	<input checked="" type="checkbox"/> CE				

▶ Maralinga military ID card. National Archives of Australia.



▶ Celebration at Maralinga, 1955. National Archives of Australia.





Three types of tests were conducted at Maralinga. Most involved detonating atomic bombs on towers (tower shot) constructed specifically for the purpose (One Tree, Breakaway, Tadge, Biak, Taranaki). One was delivered by aircraft (Kite), while one was detonated at ground level (Marcoo). After each test, the scientists conducted a series of tests to determine the bomb's yield, the strength of the explosion. They were interested in the fallout from each explosion, because by analysing the composition they could better understand how the bomb worked. The sites were populated with vehicles such as aircraft, trucks and cars so that the effect of the intense blasts could be observed after each test.

## Yield - Measuring an Atomic Explosion

Measuring the explosive force or 'yield' of atomic explosions is a critical aspect of testing. The yield of an atomic test gives its designers insight into the nuclear reaction, its efficiency and destructive force.

The yield of an atomic explosion is expressed as the mass of TNT (Trinitrotoluene) in the tons that would be required to release the same amount of energy.

By illustrating the mass of TNT required to match the explosive energy of even the smallest atomic bombs, it is possible to visualise the immense energy of atomic weapons.

### 1 Unit of atomic yield

If one ton of TNT were stored in a wooden crate, it would have a volume of 0.6 cubic metres and a height of 0.85 metres.



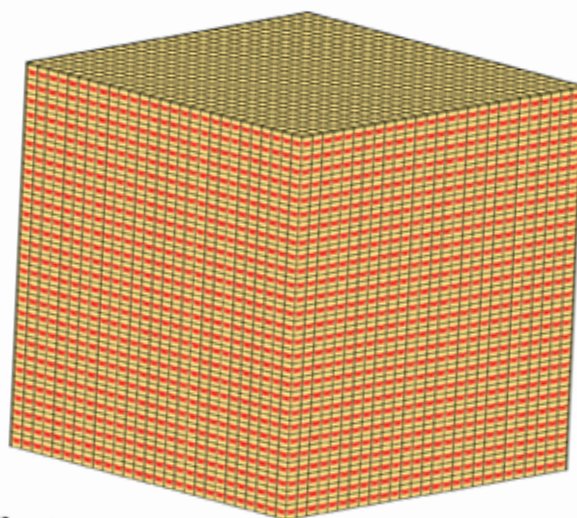
### Mk 2 Grenade

The WWII 'pineapple' grenade had an explosive yield of 57 grams of TNT. This quantity is about as large as a match box.



### 'Grand Slam' bomb

Before the atomic bomb was developed, the largest conventional bomb produced an explosion equivalent to six and a half tons (crates) of TNT.



### The 'Trinity' Test

The first atomic test in Alamogordo New Mexico produced a yield of 20 kilotons of TNT. Producing the equivalent explosion with TNT would require a cubic mass of TNT over twenty metres tall containing twenty thousand crates.





**Stop,  
See,  
Interpret,  
Share**

Kate Downhill  
(Australia; UK, b.1955)  
**Operation Hurricane**  
2013  
acrylic on dress fabric  
laid on canvas  
122 x 91 cm  
Courtesy of the artist  
© the artist



**BLACK MIST  
BURNT COUNTRY**

Examine the painting and respond  
to the questions below.

1. This fabric painting addresses some of the issues relating to the tests at the Monte Bello Islands. What is your interpretation of the text around the outside of the work?
2. Choose one of the squares in the painting and discuss what the artist is trying to say in that particular square.
3. What is the significance of the colour scheme in this artwork?



# Indigenous Culture & Land Rights

The traditional owners of the land used for the Emu Fields and Maralinga testing are the Anangu Pitjantjatjara, from the north-west of South Australia.

Once the tests had been approved, the government worked to move the Anangu Pitjantjatjara away from the testing areas by mobilising them to nearby missions such as Yalata.

Government propaganda included the threat of 'evil spirits' to scare communities from the land. Indigenous

communities on country during the explosions recall a 'black mist' settling over the ground and felt the ground shake, giving credence to the idea that an evil spirit was moving across the land.

Despite these measures, not all Aboriginal people were evacuated during the tests and over the subsequent contamination period. Military officials witnessed people walking across contaminated ground and seeing a family in the testing area.

"We rounded up the Aborigines and took them off to a safe area...and when the tests were over, and the radiation levels had subsided, they were allowed back into their own particular areas."

"We came across this family of four Aborigines, they must have walked down from Alice Springs area, passing through test areas and sleeping on the ground... the warning signs were no good to the Aborigines, they couldn't understand them. We ran a Geiger counter over them. The readings were pretty frightening."

Far left: British Air Vice Marshall.

Left: Kevin Woodland, ex-army sapper, May 1957.





Ann Marie Wood. With Support by Mima Smart, Mellissa Windlass, Glenda Ken, Polly Charra, Cynthia Charra, Carmel Windlass, Edwin Ingomar, Verna Gibson, Teresa Peters, Natasha Woods.  
 (Pitjantjatjara Anangu)  
**Maralinga Tjulkurpa** 2016  
 acrylic on canvas  
 175 x 140 cm  
 Facilitated by Pam Diment  
 Courtesy of the artists © Yalata Community

## Impacts on the Aboriginal Community

In addition to the medical side-effects that affected many people exposed to radiation at Maralinga, the cultural impact on the Anangu Pitjantjatjara people has included loss of access to their traditional grounds and sacred sites, disruption to ancestral burial areas and the contamination of food sources and materials used for cultural practices.

The Royal Commission into the British

"Because of the  
 poison from the  
 bombs being tested  
 at Maralinga the  
 country is no good.  
 No good at all."

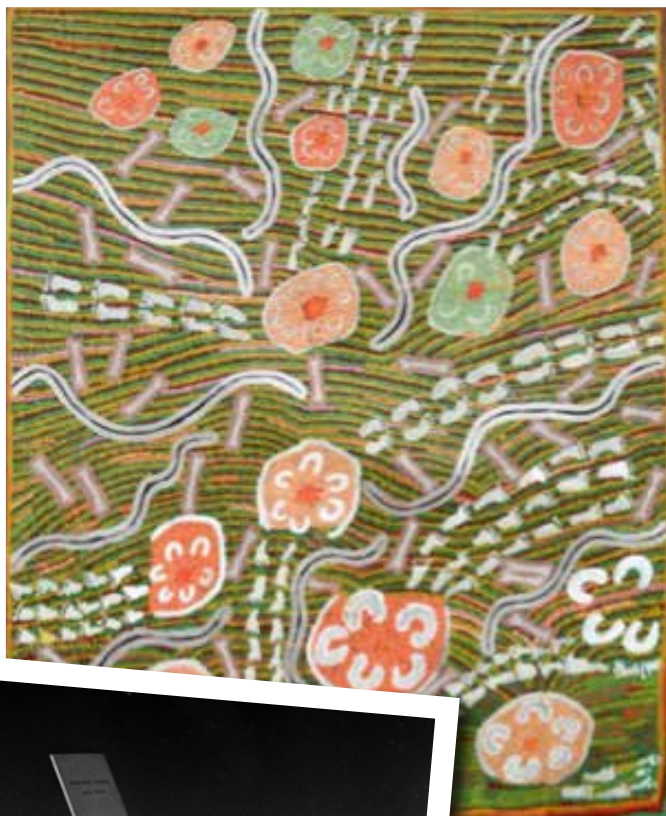
Mima Smart OAM,  
 Former Yalata Community  
 Chairperson.

Belinda Mason  
 (Australia, b.1971)  
**Maralinga** 2012  
 3D lenticular  
 holographic  
 photograph  
 60 x 90 cm framed  
 Courtesy of the artist  
 © Licensed by  
 Viscopy, 2016

Nuclear tests (1984–85) found that the local Indigenous communities had been heavily impacted by the British tests and were entitled to compensation for the damage to their health, land, community and culture. Yami Lester's accounts of the black mist incident in October 1953 were used as evidence during the Royal Commission. He suffered eye problems after being exposed to the black mist and later became blind.







Tjariya Stanley  
 (Pitjantjatjara, b.1959)  
**Puyu - Black Mist** 2015  
 acrylic on canvas  
 121 x 98 cm  
 Margo Birnberg and the artist  
 © Margo Birnberg and the artist



Tommy Queama  
 and Jack Baker  
 holding the  
 Maralinga land  
 grant documents,  
 returning the land  
 to the traditional  
 owners. 18  
 December 1984.  
 Milton Wordley/  
 Newspix.



The Royal Commission led to the passing of the Maralinga Tjarutja Land Rights Act (1984) to ensure that the prohibited area was handed back to the Anangu Pitjantjatjara ready for the time that it could be safely inhabited. The Maralinga Tjarutja Council was formed by people of Yalata and Maralinga to carry out the requirements of the act.

In 1995, a compensation payment was made by the British government to the Maralinga Tjarutja. The process of returning the land to the traditional owners was slow and dependent on the decontamination process. In 2009, Section 400, containing 3000 square kilometres, was handed back, but it was not until 2014 that the Anangu Pitjantjatjara people received unrestricted access to their ancestral homelands. The Maralinga Tjarutja have developed tours that allow visitors to enter the former test site. Public debate continues on whether the Australian government should offer an official apology, similar to the one given to the 'Stolen Generations'.

Maralinga site, 2015.  
 Photograph by JD Mittmann.





**Stop,  
See,  
Interpret,  
Share**

Yvonne Edwards  
(Pitjantjatjara, b.1950, d.2012)  
**Maralinga** 2009  
acrylic on canvas  
30 x 40 cm  
Produced for *Maralinga, The Anangu Story*  
by Yalata and Oak Valley  
Communities with Christobel  
Mattingley, first published by  
Allen & Unwin in 2009  
© Maralinga Tjarutja Inc.  
representing the Oak Valley and  
Yalata Communities, 2009



**BLACK MIST  
BURNT COUNTRY**

Examine the painting and respond  
to the questions below.

1. Which specific event is being depicted in each of the five circles?

2. Why do you think the colours of the scene shown to bottom-right are more vivid than those in the other scenes? What does the final circle represent?

3. In which order would you place the 5 scenes, and why?



# Impacts on Country & the Environment

As the British atomic tests of the 1950s were the first of their kind on Australia soil, it has been difficult to predict their short- and long-term environmental effects, despite efforts to minimise impacts at the time of the blast.

The immediate impact of the blasts on the Maralinga landscape was a dramatic

increase in temperature. Everything within a certain radius caught fire or was vaporised. The blast front, a wall of high pressure air caused by the explosion, knocked down all natural and constructed objects. Animals on the site were either killed instantly or suffered radiation sickness, similar to that of humans exposed to the testing.



The petri dish on the right holds samples of Maralinga dust that 'glazed' as a result of the blasts.

Mick Broderick  
(Australia, b.1959)

**Counts Per Minute (CPM): Alchemy** 2015  
2 x glass petri dishes. Contents: (a) Maralinga soil; (b) atomic glass fused and transmuted from soil near ground zero  
25 x 2 cm  
Courtesy of the artist  
© the artist



Following each explosion, the wind carried radioactive particles, known as fallout, from the mushroom clouds far beyond the actual testing site to highly populated areas of Australia. Fallout was also carried from the testing site on the wheels of vehicles and the soles of feet, contaminating everything they touched. Radioactive materials got into nearby bodies of water and seeped into the water table.



Cloud trajectories of the Buffalo tests at Maralinga.

## Radioactive Decay

Nuclear fallout is composed of a complex mixture of radioactive elements. Each of these elements loses its radioactivity at a different rate. Some dissipate within hours or days, while others can take thousands of years. The loss of

radioactivity is called radioactive decay. While the clean-up rehabilitation project was completed in 2000 and Maralinga was declared safe in 2014, long-lived radioactive elements still pose a danger to visitors during prolonged exposure.

Radiation levels are measured with a Geiger counter.



Banner image:  
Photograph by JD Mittmann





**Stop,  
See,  
Interpret,  
Share**

Jonathan Kumintjarra Brown  
(Pitjantjatjara, b.1950, d.1997)

**Black Rain** 1995

acrylic and sand on canvas

244 x 90 cm

Private Collection

© artist estate

*Following the atomic bombing of Hiroshima in 1945, and the British tests in South Australia, there were reports of an increase in rainfall. Rainwater got mixed with fallout from the explosions and appeared to be 'black'.*



**BLACK MIST  
BURNT COUNTRY**

Find three examples of artwork in the exhibition that depict the impact of nuclear weapons on the environment. Give a detailed explanation of each impact and how it is represented through the work.

Image 1:

Image 2:

Image 3:





# The Clean-Up

The 'clean-up' of Maralinga was organised into stages, beginning with Operation Hercules V in 1964. Its name reflected the mammoth nature of the task. In ancient Greek mythology, the fifth (v) labour of Hercules is to clean up King Augeas' stables in a single day. He achieves this by digging two large trenches in order to reroute the river through the stable doors, thereby purifying it. Operation Hercules V and the

later Operation Brumby (1967) borrowed some techniques from the ancient story by the digging of shallow trenches at the site of the explosion to bury contaminated materials. However, within a short space of time, the arid desert winds across the treeless plains caused the soil to erode and uncover these still radioactive materials.



Objects contaminated by plutonium re-buried at Maralinga. National Archives of Australia.

Banner image:  
Photograph by JD Mittmann





Jonathan Kumintjarra Brown  
(Pitjantjatjara, b.1950, d.1997)

**Frogmen** 1996

acrylic and sand on canvas

117 x 92 cm

Private Collection

© artist estate

Despite the inadequate decontamination techniques used in operations at Maralinga, it was agreed that the British government would not be held financially liable for cleaning up the area. This agreement followed the Pearce Report of 1968, which was compiled by Noah Pearce. Pearce had overseen both operations Hercules V and Brumby, and presumably understood the vast impact of the contamination and the potentially large costs for Britain. An 1984 study by the Australian Radiation Laboratory revealed that the report had not revealed the severity of the contamination. The subsequent Royal Commission into British Nuclear Tests in Australia (1985) found that Britain should bear the costs of all future clean-up operations.

In 1991, the Australian government requested that Britain contribute money to the clean-up, and a large-scale attempt was organised. However, within a few years, the operation was subject to scrutiny when Alan Parkinson, the nuclear engineer assigned to the project, publicly expressed concern about the inadequate and negligent processes being used to dispose of plutonium, a highly dangerous radioactive substance.

In March 2000, the Maralinga Rehabilitation Project was completed and the site declared clean and safe.





**Stop,  
See,  
Interpret,  
Share**

Jessie Boylan  
(Australia, b.1986)  
*Avon Hudson in his room of  
archives, Balaklava, South  
Australia* 2014  
digital inkjet print  
71 x 85 cm  
Courtesy of the artist  
© the artist.

Avon Hudson was a member of the RAAF (air force) and worked at the British testing site at Maralinga. Despite being bound by the British Official Secrets Act, he chose to reveal negligence of the operation and subsequent clean-ups. In December 1976, he revealed on national television that he had 'helped to bury 26 boxes of radioactive plutonium waste at Maralinga under just three metres of sand'.



**BLACK MIST  
BURNT COUNTRY**

Examine the photograph and caption  
and respond to the questions below.

1. Why do you think Jessie Boylan thought Avon Hudson was an important subject for a photograph?
2. What does the composition of the image tell us about the subject? (E.g. the surrounding objects and setting, the subject's pose and demeanour.)
3. What does this photograph contribute to the story of the exhibition?



# Victims & Survivors

Dr Tilman Ruff AM.

The Maralinga tests caused adverse health effects on both military personnel and civilians within the fallout zone. In many cases it was difficult to determine the extent to which people had been affected.

When the first British nuclear weapon was exploded at Maralinga on 27 September 1956, I was a toddler 18 months old living in a South Australian Housing Trust home in the southern suburbs of Adelaide. Over the 13 months, four of the seven nuclear explosions at Maralinga sent fallout over Adelaide...At the age of 34, in the absence of any identified risk factors, I developed an aggressive cancer, requiring extensive surgery. Did my exposure to radioactive fallout from nuclear bomb tests as a young child have something to do with my cancer?

## Six more radiation victims

ADELAIDE: Six new cases in South Australia of death and disease among former Maralinga atomic-bomb-test workers came to light yesterday amid growing concern about the effects of the bomb blasts on men employed at the site during the 1950s and early 1960s.

The reports bring to 30 the number of ex-servicemen, Commonwealth policemen and civilians who worked at the site and are known to have died from cancer or other diseases. At least 12 others have contracted cancer or other diseases, but are still alive.

The new cases were reported to *The Advertiser*, Adelaide, newspaper which is running a series of articles about the Maralinga tests and the possible effects of the atomic bomb explosions.

An organisation recently formed in Queensland to bring together information about possible effects — the Atomic Veterans Association — called yesterday for a full government inquiry into the effects of radiation on military and civilian personnel involved in Britain's nuclear weapons testing at Maralinga.

Personnel at Maralinga were regularly exposed to dangerous working conditions. Some came into contact with highly radioactive objects while wearing insufficiently protective clothing, and the process of decontaminating clothing, belongings and tools upon leaving the site was not always thorough. Royal Australian Air Force (RAAF) pilots were exposed to additional dangers when instructed to fly directly into mushroom clouds to collect dust samples.

Personnel reported being told to cover their eyes with their hands during the blasts; some said they could see the bones in their hands during a blast. Others were simply told to turn their backs to protect themselves from the flash. Often, fears of security leaks overrode the safety of workers.

Article in *The Canberra Times*, 18 April 1980.



## Protected

## Unprotected

Full face respirators stop contaminated air entering the eyes, nose, mouth and lung.

Blindness can be caused by looking directly at an atomic flash as the explosion burns the retina.

Full body hazard suits are made from impenetrable materials. Once used in an atomic zone, they become radioactive waste and must be decontaminated.

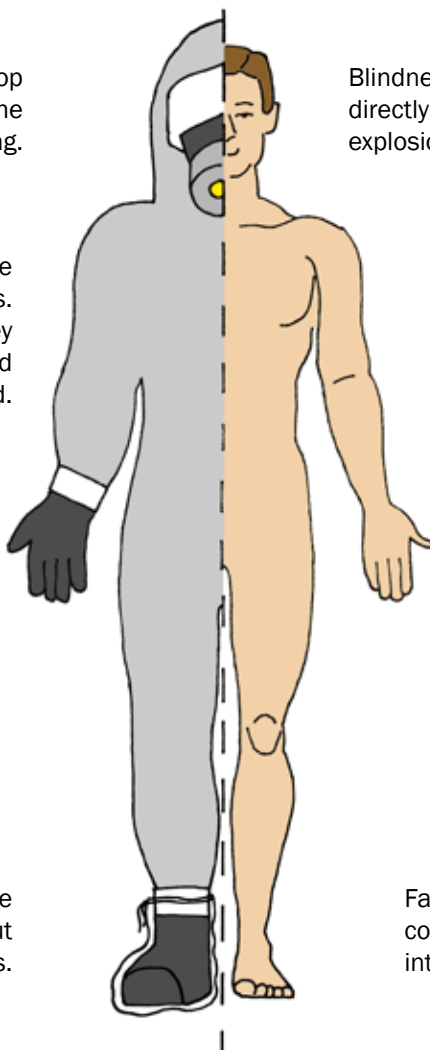
When inhaled, radioactive dust becomes lodged in the lungs, causing lung cancer.

Rubber gloves are worn as protection when handling radioactive materials.

Exposed body parts develop rashes, or if in close proximity to the blasts, lesions similar to sunburn.

Plastic covers over boots can be easily removed to stop fallout being spread to other areas.

Fallout sticks to feet and hands, contaminating anything they come into contact with.



## Radiation Exposure & the Human Body

Numerous people working at Maralinga were discharged with health issues and later died as a result of their exposure to radiation. Due to the secrecy of the project, personnel were not allowed to discuss their working conditions with others, leading to radiation sickness going undiagnosed. Compensation proved elusive for military personnel, as their pay slips and medical records made no reference to Maralinga.

In November 1985, the Royal Commission into British Nuclear Tests in Australia recommended that all victims

of the Maralinga testing, including civilians, service personnel and local Aboriginal people, should receive compensation.

The Australian Nuclear Veterans' Association and the Ex-Services Atomic Survivors Association continue to act as advocates for servicepeople who were exposed to nuclear tests. For many, this includes receiving official acknowledgement that they were exposed to harmful materials and receiving health support, legal aid and compensation for their families.



**Stop,  
See,  
Interpret,  
Share**

Craig McDonald  
(Australia; New Zealand,  
b.1958)  
*Maralinga Test Dummy* 2010  
bronze  
38 x 24 cm  
Courtesy of the artist  
© the artist



**BLACK MIST  
BURNT COUNTRY**

Examine the artwork *Maralinga Test Dummy* and respond to the questions below.



1. Who does the figure in the artwork represent?
2. In what sense were people present at Maralinga 'test dummies'?
3. If the figure was a real person, what are some of the effects he might have experienced after witnessing a blast at Maralinga?
4. To what extent are the long-term medical effects of exposure to radiation known?



# 'Ban the Bomb'

## - The Australian Anti-Nuclear Movement

In 1957, a group of artists petitioned the Australian government to cease its involvement with nuclear tests. Signatories to the petition include prominent artists Perceval, Blackman, Dargie, Waller, Counihan, Howley and French. Over time, a range of artists have expressed political views through their work, provoking public discussion on nuclear issues.

Despite the secretive beginnings of the British atomic testing program, details of the testing and clean-up operation captured the attention of the broader Australian anti-nuclear movement in the 1970s. This was followed in the 1980s by opposition to French nuclear tests in the Pacific.

Public protest against nuclear weapons manifested itself in street marches, media debates, film, television, writing, art and music. In 1982, Australian rock band Midnight Oil included a song titled

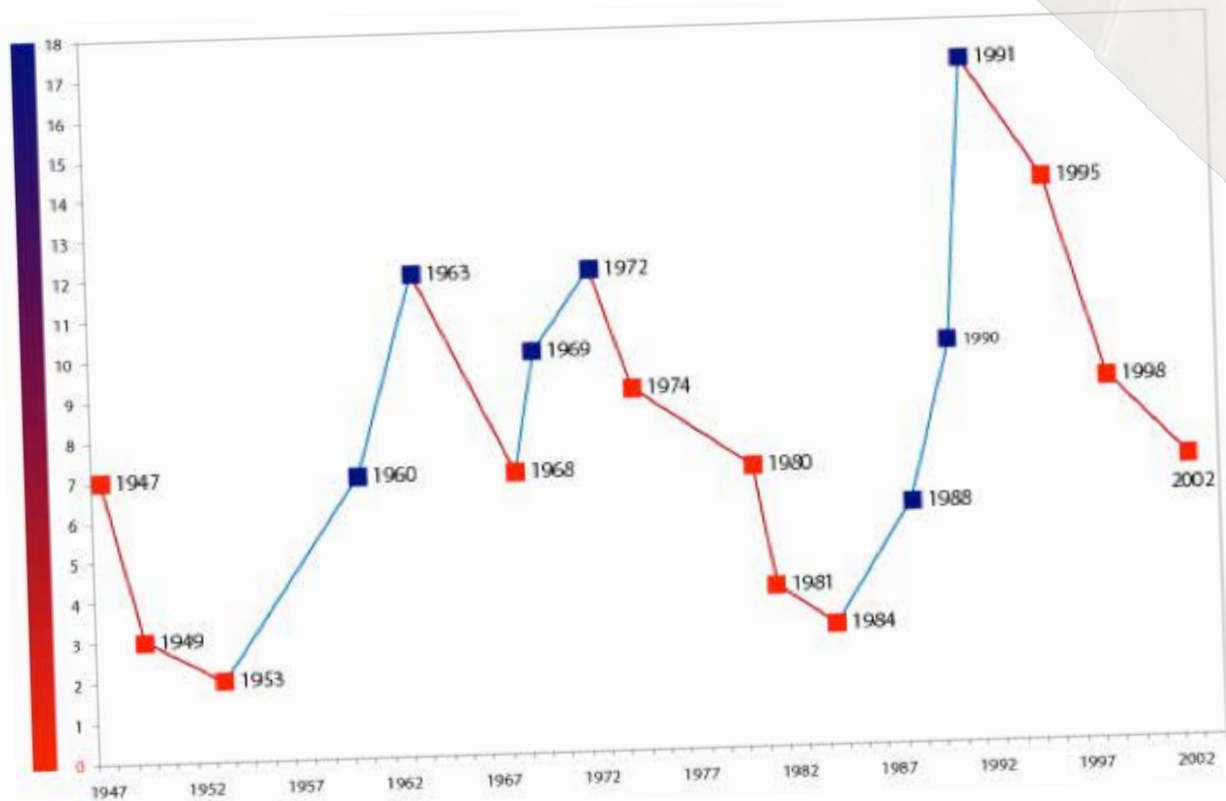
'Maralinga' on its popular album *10, 9, 8, 7, 6, 5, 4, 3, 2, 1*, thereby engaging a new generation in the issue of British atomic tests and their consequences.

In April 1983, over 150,000 people attended Palm Sunday rallies in Australian capital cities, calling for an end to the nuclear 'arms race'. A year later, the Royal Commission into British Nuclear Tests in Australia was launched. The anti-nuclear movement was aided by public anger over disasters such as the nuclear melt-downs at Three-Mile Island (Harrisburg, USA, 1979) and Chernobyl (Ukraine, 1988). Chernobyl in particular, which caused a radioactive cloud to spread across northern Europe, created widespread fear of nuclear accidents.

The 'Doomsday Clock' was a concept developed by the *Bulletin of Atomic Scientists* in 1947, two years after the catastrophic bombings of Hiroshima and Nagasaki. The clock symbolises the



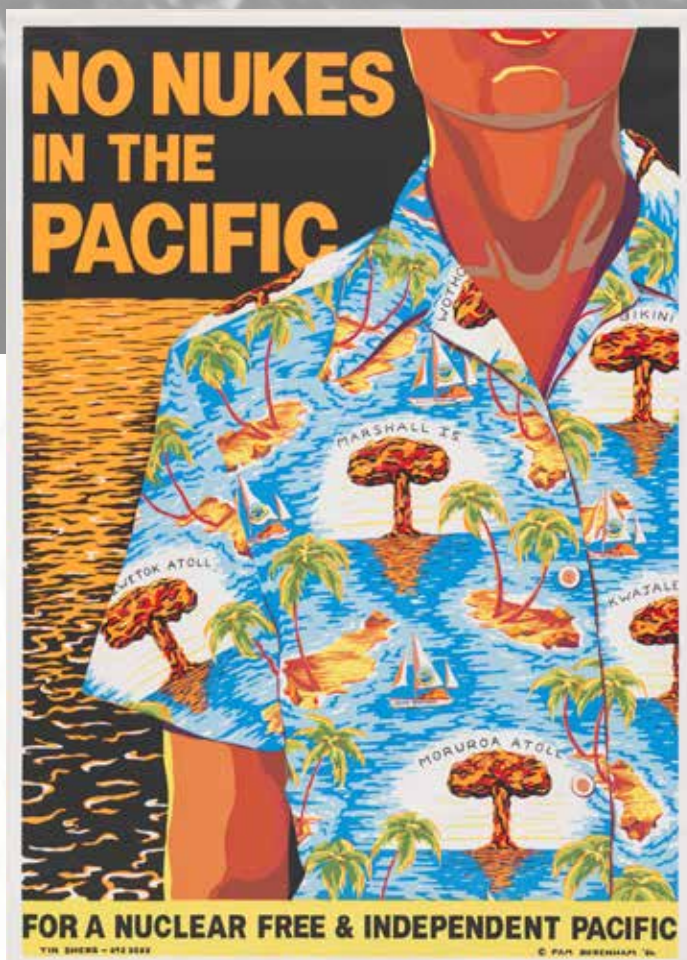
constant threat of global catastrophe by either nuclear war or climate change. The intensity of the danger is measured by how close the big hand gets to midnight. In 1953, at the Cold War was deepening, the clock was at two minutes to midnight. The clock spiked again in 1984 when United States cruise missiles were deployed in Western Europe. As of 2016, the *Bulletin of Atomic Scientists* has permanently set the hand of the clock at three minutes to midnight, signalling the imminent dangers of both nuclear and climatic disaster.



Graph showing the hand movements of the 'Doomsday Clock.'

Doomsday Clock, graphic by the *Bulletin of Atomic Scientists*





**Stop,  
See,  
Interpret,  
Share**

Pam Debenham  
(Australia, b.1955)  
*No Nukes in the Pacific* 1984  
screen print on paper  
88 x 62 cm  
Courtesy of the artist  
© the artist



Examine the screen print and  
respond to the questions below.

1. What comment is the artist making through the style and design of the shirt worn by the figure in the poster?
2. Why were Australians concerned about nuclear testing in the Pacific?
3. Which artwork in the exhibition do you find most convincing as an anti-nuclear statement or deterrent? Explain your answer.



# Australia's Nuclear Future

In the 2000s, the long-term impacts of the Maralinga tests on the local population again attracted media attention. Newspapers such as the Advertiser in South Australia, which had long taken an interest in the aftermath of the British nuclear tests, revived their coverage. This revived the spectre of the tests in public consciousness. Eventually, legislation was passed to ensure that Australian uranium can only be sold and exported for the generation of power and cannot be used to build weapons. Australia is a signatory to the international Nuclear Non-Proliferation Treaty (NPT), whose member nations agree to engage in peaceful uses of nuclear

energy only, and to work towards global disarmament.

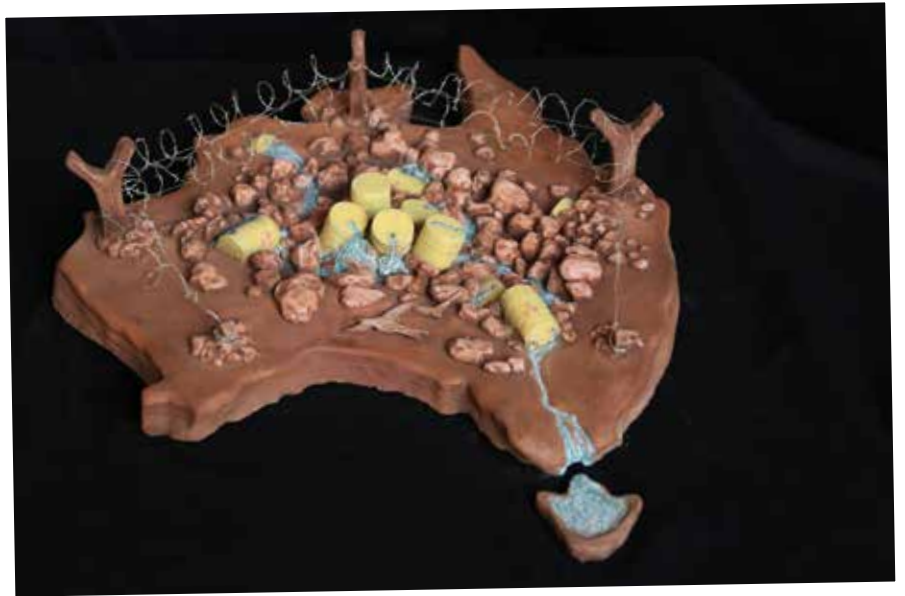
Today Australia operates only one nuclear facility. Lucas Heights, located 30 km south of Sydney, began operating as a research reactor in 1950s. It suffered one critical incident in January 1958, and was upgraded in 2007. Lucas Heights' is run by the Australian Nuclear Science and Technology Organisation (ANSTO). Their research relates the uses of nuclear energy for medicine, science, industry, commerce and agriculture. One of the facility's purposes is to produce radioisotopes for use in cancer radiotherapy. While Australia adheres to a strict anti-





▲ Lucas Heights nuclear facility.

Warren Paul  
(GROUP, b.1970) ►  
**Toxic Australia** 2015  
acrylic, clay and metal  
10 x 50 x 40 cm and 1 x 6 x 7 cm  
Courtesy of the artist  
© the artist



nuclear weaponry principle through its involvement with the Nuclear Non-Proliferation Treaty, the value of nuclear research cannot be ignored.

Some of the concerns about nuclear research in Australia relate to the disposal of nuclear waste. Waste produced by Lucas Heights is currently stored on site. However, there is ongoing debate on whether Australia should build a deep geological repository which would contain waste underground in sealed containers at a depth of 300m. Such repositories are strategically placed in stable geological locations that have remained unaffected by seismic

activity (earthquakes), bushfires or floods.

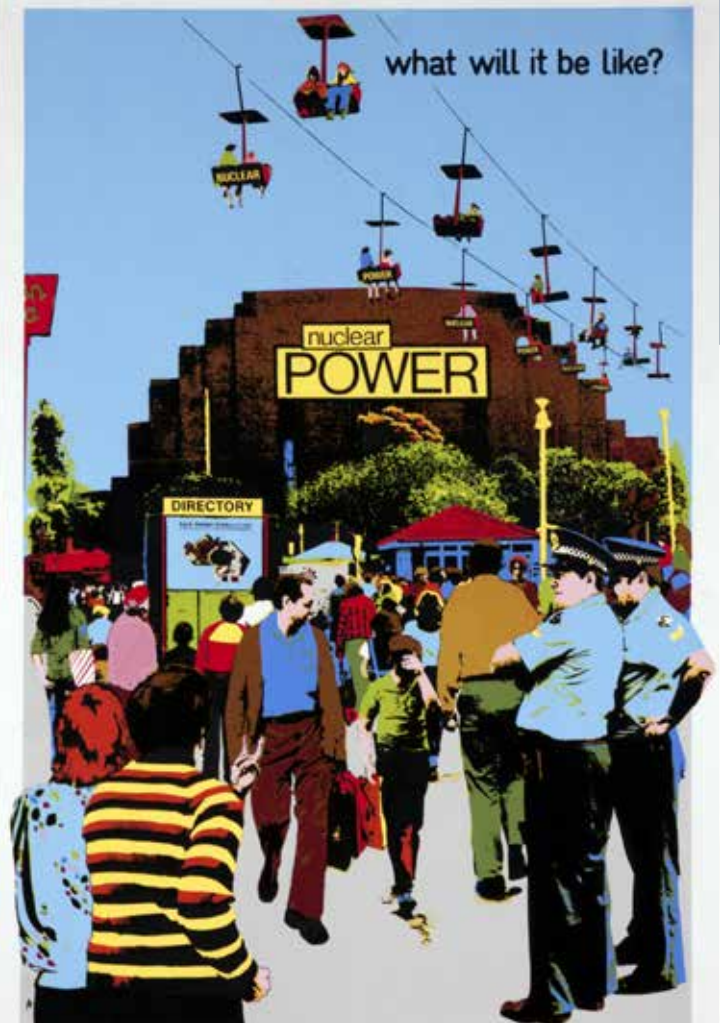
The nuclear debate in Australia centres on the environmental effects of nuclear power, the potential for nuclear weapons to proliferate, and the potential for disasters such as the 2011 nuclear accident in Fukushima, Japan. The *Black Mist Burnt Country* exhibition charts the response of artists to this debate, and to the many tragedies, questions and provocations of nuclear experimentation that have been posed and which continue to be posed in Australia and beyond.

**Stop,  
See,  
Interpret,  
Share**

Toni Robertson  
(Australia, b.1953)  
***The Royal Nuclear Show – 6*** 1981  
screenprint, colour inks on paper  
77 x 51 cm

Donated through the Australian Government's  
Cultural Gifts Program by Amanda Martin  
Flinders University Art Museum Collection  
5024.006  
© courtesy the artist

Toni Robertson created a series of posters drawing a parallel with the Sydney Royal Easter Show. This screen print shows a crowd watched by policeman before a large brown brick building labelled nuclear power. Signs promoting nuclear power are attached to chair lift cars. In the foreground a person raises two fingers to the scene.



**BLACK MIST  
BURNT COUNTRY**

Look at the poster and respond to the questions below.

1. What do the colours and composition of the poster tell you about the artist's opinion on nuclear energy in Australia
2. Why is the series of posters titled 'The Royal Nuclear Show'?
3. What public debates about nuclear energy and weapons were occurring at the time the artwork was created? (See 'Ban the Bomb' section above.)



# Key Terms

<b>Arms Race</b>	The competition between superpowers (e.g. the United States and Soviet Union) to achieve strategic supremacy over each other using nuclear weapons.
<b>Atom</b>	The smallest component of a chemical element. During a nuclear explosion, atoms of uranium or plutonium break apart, releasing energy.
<b>Bomb</b>	A device which creates an explosion.
<b>Fallout</b>	Airborne radioactive particles produced as a result of an atomic explosion.
<b>Fission</b>	The process where an atom splits, releasing energy and atomic fragments.
<b>Half-life</b>	A unit of time used to measure the decay of radioactive materials.
<b>Leukaemia</b>	A group of cancers that usually begin in the bone marrow and result in high numbers of abnormal white blood cells.
<b>Nuclear</b>	Being or using the power produced when the nucleus of an atom is divided or joined to another nucleus.
<b>Plutonium</b>	A radioactive metal that is produced by nuclear reactors. It is one of the main components of atomic bombs and is highly toxic to humans.
<b>Radioactive Contamination</b>	The deposition of, or presence of radioactive substances on surfaces or within solids, liquids or gases (including the human body), where their presence is unintended or undesirable.
<b>Radioactive Decay</b>	The process by which a radioactive nucleus, which is naturally unstable, emits particles over time and thereby transforms into another nucleus. In doing so, it becomes less radioactive.
<b>Radiation Sickness</b>	Instantaneous illness suffered by people and animals exposed to high levels of radiation. Symptoms include vomiting, skin rashes, diarrhoea, blindness and fever.
<b>Uranium</b>	Nature's heaviest naturally occurring element; that is, with the most matter in its nucleus. Particular forms of uranium can be used for powering atomic weapons or for creating plutonium
<b>Yield</b>	The unit used to measure the force of an atomic explosion relative to

Black Mist Burnt Country  
A Burrinja national touring exhibition  
Exhibition curated by JD Mittmann

Educational resource  
Developed and written by Dr Jo Clyne, History Teachers' Association of Victoria

Edited by JD Mittmann, Dr Elizabeth Tynan and Ingrid Purnell  
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